

MultiFuse⁺

Operators Manual



 **ELECTRO-SERVICES**



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empowered by Achilles

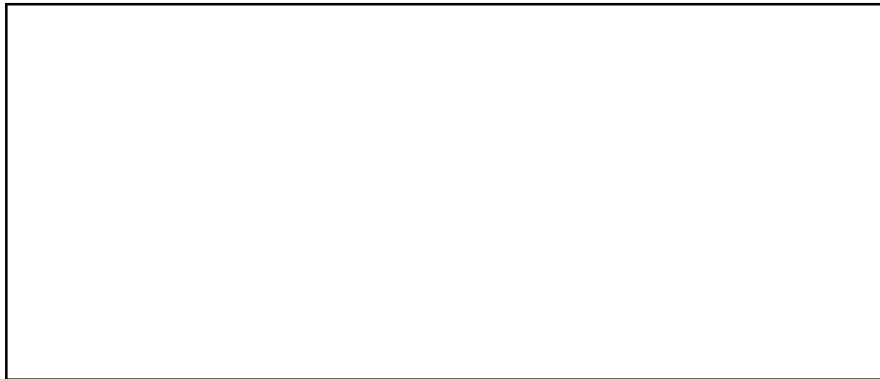


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Please contact Electro-Services Ltd for any additional information or troubleshooting procedures not mentioned in the operating instructions.

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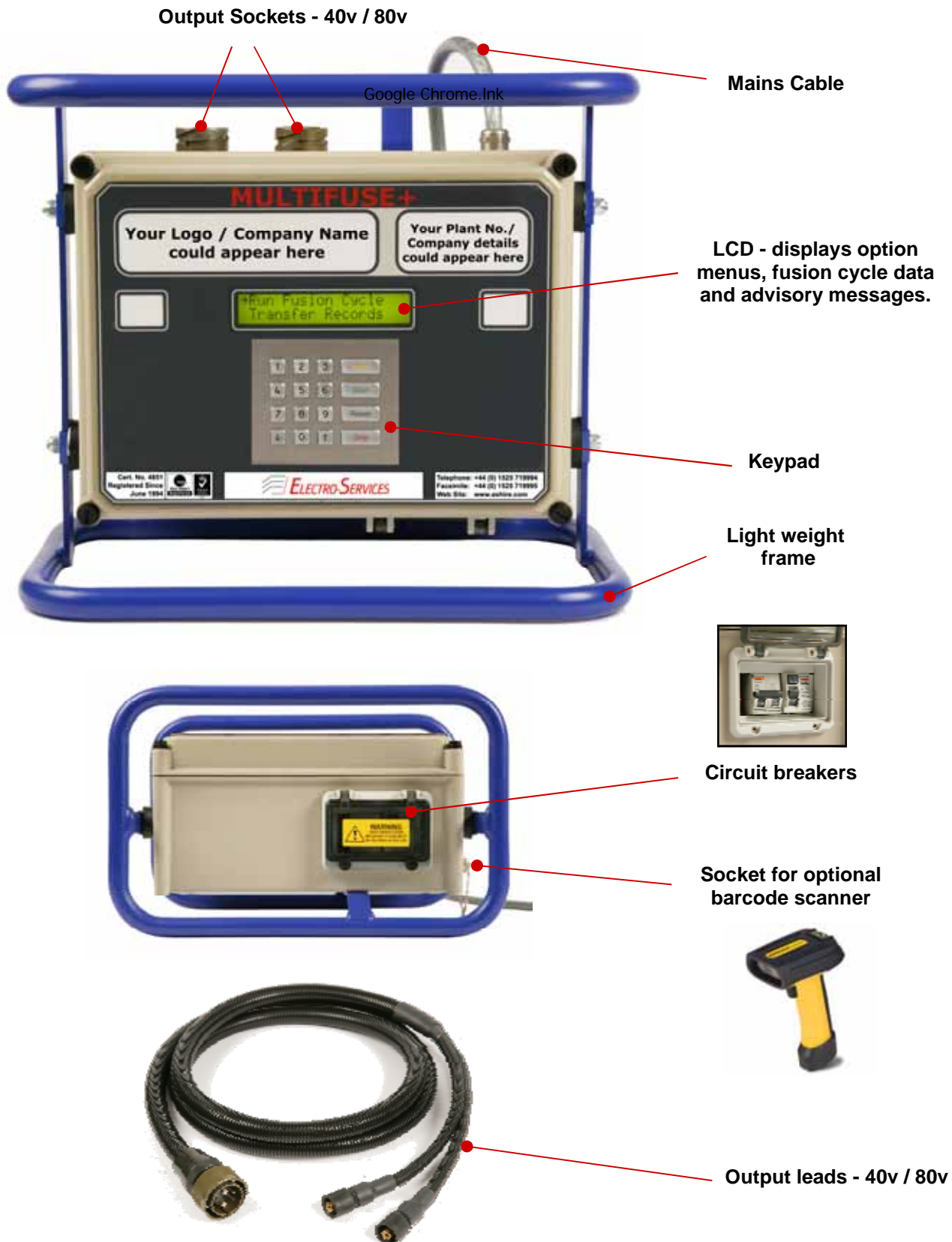
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Operating Controls



General Information

This manual gives instructions on the correct use of the MultiFuse+ Electro Fusion unit. It is important that these instructions are read and understood prior to the use of this equipment and that they are kept with the welder at all times.

Safety Notes

- **RISK OF EXPLOSION!** - The MultiFuse+ must not be used in hazardous areas
- **RISK OF ELECTRIC SHOCK!** - Do not open. No user serviceable parts inside
- Before using, always visually inspect the unit to see that the cables and connectors are not worn or damaged. Replace the damaged parts before welding
- Switch off and remove the plug from the mains before adjusting, cleaning, un-tangling cables or leaving the equipment unattended for a period of time
- To avoid damaging the unit, do not interrupt the supply voltage or disconnect the output lead, while the unit is in operation
- Do not lift or pull the equipment by its cables
- Do not disconnect the welding cables by pulling on them, always pull off the connectors from the fitting
- Do not start a weld without the pipe correctly inserted into the fitting and aligned by means of a clamp
- Do not touch the fitting during the welding cycle
- Do not weld in the rain or leave the equipment outdoors whilst it is raining
- Weld only in daylight or good artificial light
- The operator is responsible for accidents or hazards occurring to other people or their property while using the equipment. Keep the work area safe

Introduction to Electro Fusion

Electro Fusion is a method of joining PE pipes using fittings with integral heating elements. Sockets are used to join mains and service pipes and saddle fittings are used to connect services to mains.

The pipe to be joined must be prepared by removing the outer surface layer, then pipe and fitting are clamped together to prevent movement. A voltage is applied across the fitting terminals via a control box.

An electric current is passed through the wire which heats the wire and melts the polymer fusing the fitting to the pipe. After welding, the joint is allowed to cool before removing the restraining clamps.

Delivered Items

Carefully remove the MultiFuse+ from its packaging and check carefully to ensure the unit and any accessories ordered are present and undamaged. If, any damage occurred during shipment, contact our customer support department on +44 (0)1525 719994.

KEEP THE PACKAGING. Should the unit ever require service, it should be returned in its original shipping container.

Check that you have the following items;

- Electro Fusion Control Unit (34V/40v /48V/ 80v / MultiVolt/Dual 40V)
- Output Leads
- Operating Manual

Optional Extra Items

- Cool Clamp
- Barcode Scanner
- RS232 Data Download Cable

Sim Card

When you placed your order for the MultiFuse+, you were asked to supply a Sim Card to be placed within the unit. This Sim Card means that a number of the MultiFuse+ functions can be accessed via SMS texts. A summary of these text commands can be found in the glossary section (see page 39).

Technical Support

MultiFuse+ equipment users have easy access to support.

The MultiFuse+ website (www.multifuse.co.uk) is the source for all technical support and information. The website offers product support, demo's, warranty information, technical notes and instructions for returning products for repair.

If you do not have internet or email access, you may contact the technical department on +44 (0)1525 719994 or refer to the back cover of the manual for more contact information.

Using a Generator

The table below is a guide which indicates the preferred generator power for use with the MultiFuse+.

Generator Output / Power	Maximum Output / Current	Pipe ?
10 KVA	85 AMP	
6 KVA	48 AMP	
4 KVA	32 AMP	

Eco Fuel Efficiency Device

The electro fusion process calls for a cooling time at the end of each successful weld. For this cooling cycle to be recorded in the memory it is necessary to keep the box connected to the power supply, in most cases this is the generator which must of course remain running using up fuel and emitting CO₂.

Unique in the case of the MultiFuse+ is the Eco Fuel Efficiency Device which allows the display and memory to remain running whilst unplugging from the generator during the cooling time. This is due to the electronic back up design allowing the unit to continue under normal operation whilst disconnected from the generator, saving fuel and reducing CO₂ emissions.

Operating Instructions

Connect the control unit to a suitable power supply (generator/mains) using the input cable.

Connect the output lead/s from the control unit to the electro-fusion fitting/s.

STEP 1

Property of
ELECTRO-SERVICES LTD

When power is applied, the display will show ownership

STEP 2

Multifuse+ MV
F/ware ver. 2.50.0

followed by the unit type and firmware version.

If the unit is due for calibration, the following will then be displayed, otherwise the main menu will be displayed as step (11).

STEP 3

Calibration required
in 14 days

This advisory message is displayed for a 14-day period immediately prior to the due calibration date. The number of days remaining decrements each day. It is displayed for approximately 1.5 secs; the main menu is then displayed as step (11).

STEP 4

Calibration required
To continue-press 1

This will be displayed once the 14-day period has expired. Press '1' to continue.

If the calibration 'lockdown' option is enabled, the following will then be displayed. If this option is disabled, the main menu will be displayed as step (11). With this option enabled, it is not possible to run any more fusion cycles until the unit has been re-calibrated or a PIN has been entered to override the 'lockdown' function. Overriding this function allows a further 10 joints to be completed during the 28-day period following the due calibration date (note that a dual cycle is regarded a single joint). If the 'lockdown' function has been overridden previously, the number of joints remaining will be displayed as step (9).

STEP 5

Calibration required
Enter PIN Yes/No

If PIN authorisation has been obtained, press 'YES' and continue, otherwise press 'NO' and go to step (10).

STEP 6

Calibration required
Enter PIN - _

Enter your unlocking PIN and press the 'ENTER' key on completion. If an incorrect entry is made, press 'CLEAR' and re-enter the PIN. Press 'CLEAR' twice in succession to exit PIN entry and go to step (10).

STEP 7

Calibration required
PIN Incorrect

If an incorrect PIN is entered, this will be displayed for approximately 1.5 secs.; step (6) will then be repeated.

STEP 8 Calibration required
10 joints remaining

If the PIN entry is correct, this will be displayed for approximately 1.5 secs; the main menu is then displayed as step (11).

STEP 9 Calibration required
6 joints remaining

This is displayed when power is applied to the unit and after the completion of each joint. After each joint, the number remaining is decremented. It is displayed for approximately 1.5 secs; the main menu is then displayed as step (11). If all 10 joints have been completed or the 28-day period has expired, the 'lockdown' message is displayed instead as step (10).

STEP 10 Box locked - phone
01525 719994
→ Run Fusion Cycle
Transfer Records

The display will then alternate between this

AND this. When this is displayed it is possible to select 'Transfer Records' but not to run a fusion cycle. The operator should phone the contact number displayed.

STEP 11 → Run Fusion Cycle
Transfer Records

Press the 'ENTER' key to run a fusion cycle.

If the unit is configured as a dual cycle fixed voltage or multi-voltage output unit, continue. For single cycle fixed voltage or multi-voltage output units, steps (12) and (13) are omitted.

STEP 12 Run dual cycle
Yes/No

Press 'Yes' or 'No' as required.

STEP 13 Unit set for dual
cycle operation
Unit set for single
cycle operation

The appropriate confirmatory message is then displayed for approximately 1.5 secs. If single cycle operation has been selected, continue; for dual cycle operation, go to step (14) on pg. 18

STEP 14 Run pre-heat cycle
Yes/No

If the option to run a pre-heat cycle is enabled, this is displayed. Press 'Yes' and continue or 'No' and go to step (16). If this option is disabled, steps (14) and (15) are omitted.

STEP 15 Run soak cycle
Yes/No

Press 'Yes' or 'No' as required.

If a barcode scanner is connected, continue. Otherwise for multi-voltage output units go to step (38) if a pre-heat cycle is required, if not, go to step (44); for fixed voltage output units go to step (47).

STEP 16

Scan fitting barcode/s	Yes/No
---------------------------	--------

Press 'Yes' and continue or press 'No' and for multi-voltage output units go to step (38) if a pre-heat cycle is required, if not, go to step (44); for fixed voltage output units go to step (47).

STEP 17

Initialising data port - please wait

This is displayed briefly while the scanner port is being enabled.

If the option to run a pre-heat cycle is disabled or a pre-heat cycle is not required, go to step (32).

STEP 18

Scan preheat barcode	Yes/No
----------------------	--------

Press 'Yes' and continue or 'No' (e.g. if the barcode is obviously damaged) and go to step (25).

STEP 19

Scan preheat barcode

Scan the pre-heat barcode.

If the display of step (19) remains unchanged after successfully scanning the barcode (normally indicated by a 'beep' from the scanner), there is a fault with the scanner/lead assembly or an internal fault in the unit. Press 'CLEAR' to exit the scanning process and go to step (38). If the barcode cannot be read because it's damaged or in the wrong format, press '1' and go to step (25).

STEP 20

40V PHT=180s Confirm?	Yes/No
--------------------------	--------

If the data is received without error, this will be displayed. Press 'Yes' if the data is correct and go to step (25).

STEP 21

Retry?	Yes/No
--------	--------

If the 'No' key was pressed because the data is incorrect, press 'Yes' to repeat step (19) or 'No' and go to step (25).

STEP 22

Data error! Retry?	Yes/No
-----------------------	--------

If there is an error recovering the barcode data this will be displayed. Press 'Yes' to repeat step (19) or 'No' and go to step (25).

STEP 23

Data error! To continue-press 1

If the barcode data specifies an operating mode which is incompatible with the unit, this will be displayed. Press '1' and go to step (25).

STEP 24

Incorrect fitting
type

If the barcode data specifies a fitting voltage which is incompatible with the unit's operating voltage (e.g. a 48V fitting is specified but the unit is configured to generate a fixed 40V output), this is displayed. It's displayed for approximately 1.5 secs.; the main menu is then re-displayed as step (11).

STEP 25

Scan fusion barcode
Yes/No

Press 'Yes' and continue or 'No' (e.g. if the barcode is obviously damaged) and for multi-voltage output units go to step (41) or, if there was an error scanning the pre-heat barcode, go to step (38); for fixed voltage output units go to step (47).

STEP 26

Scan fusion barcode

Scan the fusion barcode.

If the display of step (26) remains unchanged after scanning the barcode, there is a fault or the barcode is unreadable. Press 'CLEAR' to exit the scanning process and for multi-voltage output units go to step (41) or, if there was an error scanning the pre-heat barcode, go to step (38); for fixed voltage output units go to step (47).

STEP 27

40V FT=24s CT=5m
Confirm? Yes/No

If the data is received without error, EITHER this

40V FT=24s CT=NA
Confirm? Yes/No

OR this will be displayed depending on whether or not the barcode includes cooling time data. Press 'Yes' if the data is correct. If the pre-heat barcode was scanned successfully, go to step (47). Otherwise for multi-voltage output units go to step (38) and for fixed voltage output units go to step (47).

STEP 28

Retry? Yes/No

If the 'No' key was pressed because the data is incorrect, press 'Yes' to repeat step (26) or press 'No' and refer to the note below.

STEP 29

Data error!
Retry? Yes/No

If there is an error recovering the barcode data this will be displayed. Press 'Yes' to repeat step (26) or press 'No' and refer to the note below.

STEP 30

Data error!
To continue-press 1

If the barcode data specifies an operating mode which is incompatible with the unit, this will be displayed. Press '1' and refer to the note below.

At steps (28) through (30) above, if the 'No' or '1' key is pressed then for multi-voltage output units go to step (41) or, if there was an error scanning the pre-heat barcode, go to step (38); for fixed voltage output units go to step (47).

STEP 31

Incorrect fitting
type

As step (24) above.

STEP 32

Scan barcode

If a pre-heat cycle is not required or the option is disabled, this is displayed. Scan the fusion barcode.

If the display of step (32) remains unchanged after successfully scanning the barcode (normally indicated by a 'beep' from the scanner), there is a fault with the scanner/lead assembly, an internal fault in the unit or the barcode cannot be read because it's damaged or in the wrong format. Press 'CLEAR' to exit the scanning process and for multi-voltage output units go to step (44), for fixed voltage output units go to step (47).

STEP 33

40V FT=24s CT=5m
Confirm? Yes/No

If the data is received without error, EITHER this

40V FT=24s CT=NA
Confirm? Yes/No

OR this will be displayed depending on whether or not the barcode includes cooling time data. Press 'Yes' if the data is correct and go to step (47).

STEP 34

Retry? Yes/No

If the 'No' key was pressed because the data is incorrect, press 'Yes' to repeat step (32) or press 'No' and refer to the note below.

STEP 35

Data error!
Retry? Yes/No

If there is an error recovering the barcode data this will be displayed. Press 'Yes' to repeat step (32) or press 'No' and refer to the note below.

STEP 36

Data error!
To continue-press 1

If the barcode data specifies an operating mode which is incompatible with the unit, this will be displayed. Press '1' and refer to the note below.

At steps (34) through (36) above, if the 'No' or '1' key is pressed then for multi-voltage output units go to step (44), for fixed voltage output units go to step (47).

STEP 37

Incorrect fitting
type

If the barcode data specifies a fitting voltage which is incompatible with the unit's operating voltage (e.g. a 48V fitting is specified but the unit is configured to generate a fixed 40V output), this is displayed. It's displayed for approximately 1.5 secs.; the main menu is then re-displayed as step (11).

If the required output voltage has to be entered manually then note that valid entries are from 18-50V for dual cycle multi-voltage units and from 18-80V for single cycle multi-voltage units. Both ranges are in increments of 1V.

STEP 38

Enter preheat volts
40_

Enter the required voltage and then press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice in succession to return to the main menu.

STEP 39

Unit set to 40V
for preheat cycle

If the entry is valid, this confirmatory message will then be displayed for approximately 2 secs. Then, if the fusion barcode was scanned successfully, go to step (47) otherwise go to step (41).

STEP 40

Invalid entry!

If the voltage entered is out of range, this error message will be displayed for approximately 2 secs.; step (39) will then be repeated.

STEP 41

Enter fusion volts
40_

Enter the required voltage and then press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice in succession to return to the main menu.

STEP 42

Unit set to 40V
for fusion cycle

If the entry is valid, this confirmatory message will then be displayed for approximately 2 secs. The message of step (47) will then be displayed.

STEP 43

Invalid entry!

If the voltage entered is out of range, this error message will be displayed for approximately 2 secs.; step (41) will then be repeated.

STEP 44

Enter fitting volts
40_

Enter the required voltage and then press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.

STEP 45

Unit set to 40V

If the entry is valid, this confirmatory message will then be displayed for approximately 2 secs. The message of step (47) will then be displayed.

STEP 46

Invalid entry!

If the voltage entered is out of range, this error message will be displayed for approximately 2 secs.; step (44) will then be repeated.

STEP 47

Auto clamp detection
Yes/No

If the option to use Electro-Services Cool Clamps is enabled, this will be displayed. Otherwise this step and step (49) are omitted. Press 'Yes' or 'No' as required.

STEP 48

Connect fitting

If the leads have not been connected to the fitting or there is a fitting fault, this is displayed. If the fault cannot be rectified, press the 'CLEAR' key to return to the main menu.

STEP 49

Fit clamp

If an Electro-Services Cool Clamp is being used, this will be displayed if the clamp is not fitted or not connected to the unit. Fit/connect the clamp or press the 'CLEAR' key to return to the main menu

Steps (50) through (59) are optional entries and will be omitted if these options are disabled.

- | | | |
|----------------|---|--|
| STEP 50 | Enter Operator No.
Yes/No | Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return the main menu. |
| STEP 51 | Enter Operator No.
— | If 'Yes', enter the operator No. and press the 'ENTER' key on completion. Press the 'CLEAR' key to correct an entry. |
| STEP 52 | Enter Job location
Yes/No | If a GPS receiver is not fitted, this will be displayed otherwise steps (52) and (53) are omitted. Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu |
| STEP 53 | Enter Job location
— | If 'Yes', enter the job location. To enter the location postcode/zip code, use the '↑' and '↓' keys to select a character and press 'ENTER'. If the correct character is already displayed, just press 'ENTER'. Use the 'CLEAR' key to correct an entry. Available characters are 0-9, -, SPACE and A-Z. |
| STEP 54 | Is pipe scraped?
Yes/No | Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu. |
| STEP 55 | Is pipe clamped?
Yes/No | If an Electro-Services Cool Clamp is being used this step is omitted. Otherwise, press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu. |
| STEP 56 | Auto detect
Yes/No | If the 'Fusamatic' option is enabled, a pre-heat cycle is not required and fusion barcode data is unavailable, this is displayed. Otherwise steps (56) through (59) are omitted. Press 'Yes' and continue or 'No' and go to step (62). Press the 'CLEAR' key to return to the main menu. |
| STEP 57 | Auto recognition | This is displayed for approximately 1 sec. while the weld time is calculated from the fitting's implanted resistor value. |
| STEP 58 | Weld time 50s
Confirm time Yes/No | The weld time is then displayed. Press 'Yes' if the time is correct and if a cooling cycle is required go to step (63), otherwise go to step (64). If the time is incorrect, press 'No' and go to step (62). |
| STEP 59 | R value invalid
To continue-press 1 | If this is displayed there is a probable fitting or connection fault. Press '1' and go to step (62). |

If the fitting barcode/s was/were scanned successfully and a soak cycle is not required, steps (60) through (63) are omitted. If a soak cycle is required, go to step (61).

STEP 60

Enter preheat time
 —

If a pre-heat cycle is not required or the option is disabled, steps (60) and (61) are omitted. Otherwise enter the time in seconds and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.

STEP 61

Enter soak time
 —

If a soak cycle is not required, this step is omitted. Otherwise enter the time in seconds and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.

STEP 62

Enter fusion time
 —

If the barcode or 'Fusamatic' data was valid, this step is omitted. Otherwise enter the time in seconds and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.

STEP 63

Enter cooling time
 —

If the option to run cooling cycles is disabled, this step is omitted. Otherwise enter the time in minutes and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.

STEP 64

Press START

Press the 'START' key to begin the cycle.

If a pre-heat cycle is not required or the option is disabled, steps (65) and (66) are omitted.

STEP 65

Preheat time 34 sec
 39.6V 20.6A 113V

The time remaining, pre-heat voltage and current and the supply voltage are displayed during the pre-heat cycle.

STEP 66

Soak time 142 secs

The time remaining is displayed during the soak cycle.

STEP 67

Weld time 34 secs
 39.4V 20.5A 113V

The time remaining, welding voltage and current and the supply voltage are displayed during the welding cycle.

STEP 68

Cool time 297 secs
 DO NOT REMOVE CLAMP

If the option to run cooling cycles is disabled, this step is omitted. Otherwise the time remaining is displayed during the cooling cycle.

Note that if a fault occurs during the fusion cycle, the type of fault is displayed (see 'Fault Finding' section on pg. XX).

- | | | |
|----------------|--|--|
| STEP 69 | Cycle complete
To continue-press 1 | If the cycle completes successfully, this is displayed. Press '1' and continue. Note that steps (69) through (73) are optional and may be omitted. |
| STEP 70 | GPS fix invalid | If the unit is fitted with a GPS receiver and the fix is invalid, this is displayed. Otherwise steps (70) through (72) are omitted. |
| STEP 71 | Enter Job location
Yes/No | Press the 'Yes' or 'No' key as required. |
| STEP 72 | Enter Job location
— | If 'Yes', enter the job location. To enter the location postcode/zip code, use the '↑' and '↓' keys to select a character and press 'ENTER'. If the correct character is already displayed, just press 'ENTER'. Use the 'CLEAR' key to correct an entry. Available characters are 0-9, -, SPACE and A-Z. |
| STEP 73 | Saved record 44
To continue-press 1 | The fusion cycle record is saved. Press '1' to return to the main menu. |
| STEP 74 | → Run Fusion Cycle
Transfer Records | Use the '↑' and '↓' keys to select and press 'ENTER' to run another fusion cycle or transfer records. |

DUAL CYCLE OPERATION

If a barcode scanner is connected, continue. Otherwise for multi-voltage output units go to step (30), for fixed voltage output units go to step (36).

STEP 14

Scan fitting
barcode/s Yes/No

Press 'Yes' and continue or press 'No' and for multi-voltage output units go to step (30), for fixed voltage output units go to step (36).

STEP 15

Initialising data
port - please wait

This is displayed briefly while the scanner port is being enabled.

STEP 16

Scan first barcode
Yes/No

Press 'Yes' and continue or 'No' (e.g. if the barcode is obviously damaged) and go to step (23).

STEP 17

Scan first barcode

Scan the barcode of fitting 1.

If the display of step (17) remains unchanged after successfully scanning the barcode (normally indicated by a 'beep' from the scanner), there is a fault with the scanner/lead assembly or an internal fault in the unit. Press 'CLEAR' to exit the scanning process and for multi-voltage output units go to step (30), for fixed voltage output units go to step (36). If the barcode cannot be read because it's damaged or in the wrong format, press '1' and go to step (23).

STEP 18

40V FT=24s CT=5m
Confirm? Yes/No

If the data is received without error, EITHER this

40V FT=24s CT=NA
Confirm? Yes/No

OR this will be displayed depending on whether or not the barcode includes cooling time data. Press 'Yes' if the data is correct and go to step (23).

STEP 19

Retry? Yes/No

If the 'No' key was pressed because the data is incorrect, press 'Yes' to repeat step (17) or 'No' and go to step (23).

STEP 20

Data error!
Retry? Yes/No

If there is an error recovering the barcode data this will be displayed. Press 'Yes' to repeat step (17) or 'No' and go to step (23).

STEP 21

Data error!
To continue-press 1

If the barcode data specifies an operating mode which is incompatible with the unit, this will be displayed. Press '1' and go to step (23).

STEP 22

Incorrect fitting
type

If the barcode data specifies a fitting voltage which is incompatible with the unit's operating voltage (e.g. a 48V fitting is specified but the unit is configured to generate a fixed 40V output), this is displayed. It's displayed for approximately 1.5 secs.; the main menu is then re-displayed as step (11).

STEP 23

Scan second barcode
Yes/No

Press 'Yes' and continue or 'No' (e.g. if the barcode is obviously damaged) and for multi-voltage output units go to step (33) or, if there was an error scanning the barcode of fitting 1, go to step (30); for fixed voltage output units go to step (36).

STEP 24

Scan second barcode

Scan the barcode of fitting 2.

If the display of step (24) remains unchanged after scanning the barcode, there is a fault or the barcode is unreadable. Press 'CLEAR' to exit the scanning process and for multi-voltage output units go to step (33) or, if there was an error scanning the barcode of fitting 1, go to step (30); for fixed voltage output units go to step (36).

STEP 25

40V FT=36s CT=5m
Confirm? Yes/No

If the data is received without error, EITHER this

40V FT=36s CT=NA
Confirm? Yes/No

OR this will be displayed depending on whether or not the barcode includes cooling time data. Press 'Yes' if the data is correct and for multi-voltage output units go to step (36) or, if there was an error scanning the barcode of fitting 1, go to step (30); for fixed voltage output units go to step (36).

STEP 26

Retry? Yes/No

If the 'No' key was pressed because the data is incorrect, press 'Yes' to repeat step (24) or press 'No' and refer to the note below.

STEP 27

Data error!
Retry? Yes/No

If there is an error recovering the barcode data this will be displayed. Press 'Yes' to repeat step (24) or press 'No' and refer to the note below.

STEP 28

Data error!
To continue-press 1

If the barcode data specifies an operating mode which is incompatible with the unit, this will be displayed. Press '1' and refer to the note below.

At steps (26) through (28) above, if the 'No' or '1' key is pressed then for multi-voltage output units go to step (33) or, if there was an error scanning the barcode of fitting 1, go to step (30); for fixed voltage output units go to step (36).

STEP 29

Incorrect fitting
type

As step (22) above.

If the required output voltage has to be entered manually then note that valid entries are from 18-50V in increments of 1V.

STEP 30	Enter fitting 1 volt 40_	Enter the required voltage and then press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice in succession to return to the main menu.
STEP 31	Unit set to 40V for fitting 1	If the entry is valid, this confirmatory message will then be displayed for approximately 2 secs. Then, if the barcode of fitting 2 was scanned successfully, go to step (36) otherwise go to step (33).
STEP 32	Invalid entry!	If the voltage entered is out of range, this error message will be displayed for approximately 2 secs.; step (30) will then be repeated.
STEP 33	Enter fitting 2 volt 40_	Enter the required voltage and then press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice in succession to return to the main menu.
STEP 34	Unit set to 40V for fitting 2	If the entry is valid, this confirmatory message will then be displayed for approximately 2 secs. The message of step (36) will then be displayed.
STEP 35	Invalid entry!	If the voltage entered is out of range, this error message will be displayed for approximately 2 secs.; step (33) will then be repeated.
STEP 36	Auto clamp detection Yes/No	If the option to use Electro-Services Cool Clamps is enabled, this will be displayed. Otherwise this step and step (38) are omitted. Press 'Yes' or 'No' as required.
STEP 37	Connect fitting 1	If the leads have not been connected to fitting 1 or there is a fitting fault, this is displayed. If the fault cannot be rectified, press the 'CLEAR' key to return to the main menu.
STEP 38	Fit clamp 1	If Electro-Services Cool Clamps are being used, one of these messages will be displayed if the clamp/s is/ are not fitted or not connected to the unit. Fit/connect the clamp/s or press the 'CLEAR' key to return to the main menu
	Fit clamp 2	
	Fit clamps	

Steps (39) through (XX) are optional entries and will be omitted if these options are disabled.

- | | | |
|----------------|--|--|
| STEP 39 | Enter Operator No.
Yes/No | Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return the main menu. |
| STEP 40 | Enter Operator No.
— | If 'Yes', enter the operator No. and press the 'ENTER' key on completion. Press the 'CLEAR' key to correct an entry. |
| STEP 41 | Enter Job location
Yes/No | If a GPS receiver is not fitted, this will be displayed otherwise steps (41) and (42) are omitted. Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu |
| STEP 42 | Enter Job location
— | If 'Yes', enter the job location. To enter the location postcode/zip code, use the '↑' and '↓' keys to select a character and press 'ENTER'. If the correct character is already displayed, just press 'ENTER'. Use the 'CLEAR' key to correct an entry. Available characters are 0-9, -, SPACE and A-Z. |
| STEP 43 | Is pipe scraped?
Yes/No | Press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu. |
| STEP 44 | Is pipe clamped?
Yes/No | If an Electro-Services Cool Clamp is being used this step is omitted. Otherwise, press the 'Yes' or 'No' key as required. Press the 'CLEAR' key to return to the main menu. |
| STEP 45 | Auto detect
Yes/No | If the 'Fusamatic' option is enabled and one or both fitting barcode/s has/have not been scanned, this is displayed. Otherwise steps (45) through (51) are omitted. Press 'Yes' and continue or 'No' and go to step (52). Press the 'CLEAR' key to return to the main menu. |
| STEP 46 | Auto recognition | This is displayed for approximately 1 sec. while the weld time is calculated from the fitting's implanted resistor value. If valid barcode data was obtained for fitting 1 go to step (50) else continue. |
| STEP 47 | Weld time 1 50s
Confirm time Yes/No | The weld time for fitting 1 is then displayed. Press 'Yes' if the time is correct and if valid barcode data was obtained for fitting 2 go to step (52), otherwise go to step (49). If the time is incorrect, press 'No' and go to step (49). |
| STEP 48 | R value invalid
To continue-press 1 | If this is displayed there is a probable fitting or connection fault. Press '1' and go to step (49). |

STEP 49	Auto recognition	This is displayed for approximately 1 sec. while the weld time is calculated from the fitting's implanted resistor value.
STEP 50	Weld time 2 40s Confirm time Yes/No	The weld time for fitting 2 is then displayed. Press 'Yes' if the time is correct. If valid barcode or 'Fusamatic' data was obtained for fitting 1 and cooling cycles are not required, go to step (56). If cooling cycles are required, go to step (54). If the time is incorrect, press 'No' and go to step (53) or, if the data obtained for fitting 1 was invalid, go to step (52).
STEP 51	R value invalid To continue-press 1	If this is displayed there is a probable fitting or connection fault. Press '1' and go to step (53) or, if the data obtained for fitting 1 was invalid, go to step (52).
If valid barcode or 'Fusamatic' data was obtained for both fittings, steps (52) and (53) are omitted.		
STEP 52	Enter fusion time 1 —	Enter the time in seconds and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.
STEP 53	Enter fusion time 2 —	Enter the time in seconds and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.
If the option to run cooling cycles is disabled or valid barcode data was obtained for both fittings, steps (54) and (55) are omitted.		
STEP 54	Enter cooling time 1 —	Enter the time in minutes and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.
STEP 55	Enter cooling time 2 —	Enter the time in minutes and press the 'ENTER' key. Press the 'CLEAR' key to correct an entry. Press 'CLEAR' twice to return to the main menu.
STEP 56	Press START	Press the 'START' key to begin the welding cycle of fitting 1.
STEP 57	Weld 1 34 secs 39.4V 20.5A 113V	The time remaining, welding voltage and current and the supply voltage are displayed during the welding cycle.

STEP 58

Cooling 1 297 secs
DO NOT REMOVE CLAMP

At the start of the cooling cycle for fitting 1 the time remaining will be displayed for approximately 3 secs. If the option to run cooling cycles is disabled, this step is omitted.

Note that if a fault occurs during the first fusion cycle, the type of fault is displayed (see 'Fault Finding' section) and the second fusion cycle does not proceed.

STEP 59

Connect fitting 2

If the leads have not been connected to fitting 2 or there is a fitting fault, this will be displayed otherwise the welding cycle data is displayed as step (61).

If the fault cannot be rectified, pressing the 'CLEAR' key will abort the cycle. If the option to run cooling cycles is enabled, the time remaining for cooling cycle 1 will be re-displayed as step (58). Otherwise cycle completion is displayed as step (71).

STEP 60

Press START

Once the fault is rectified, press the 'START' key to begin the welding cycle of fitting 2.

STEP 61

Weld 2 42 secs
39.4V 16.5A 113V

This is displayed during the welding cycle of fitting 2. If the option to run cooling cycles is enabled, pressing the '↑' or '↓' key will alternate the display between this and the cooling cycle data display of fitting 1 as step (58).

If the option to run cooling cycles is disabled, steps (62) through (65) are omitted.

STEP 62

Cooling 2 180 secs
DO NOT REMOVE CLAMP

At the end of the second welding cycle this will be displayed for approximately 1 sec.

STEP 63

Cooling 1 118 secs
Cooling 2 179 secs

After which, this will be displayed if both cooling cycles are running.

STEP 64

Cycle 1 complete
To continue-press 1

When one of the cooling cycles finishes, this is displayed, press '1'.

STEP 65

Cooling 2 46 secs
DO NOT REMOVE CLAMP

The display will then indicate the time remaining for the other cooling cycle.

If a fault occurs during the second fusion cycle, the type of fault is displayed (see 'Fault Finding' section). After acknowledging the fault (by pressing the '1' key), if cooling cycle 1 is still running, the time remaining will be re-displayed as step (58).

STEP 66	Both cycles complete To continue-press 1	This is displayed when both cycles have finished. Note that steps (66) through (72) are optional and may be omitted.
STEP 67	Cycle complete To continue-press 1	If the second cycle was aborted because of a fault, this is displayed on completion of the first cooling cycle.
STEP 68	GPS fix invalid	If the unit is fitted with a GPS receiver and the fix is invalid, this is displayed. Otherwise steps (68) through (70) are omitted.
STEP 69	Enter Job location Yes/No	Press the 'Yes' or 'No' key as appropriate.
STEP 70	Enter Job location —	If 'Yes', enter the job location. To enter the location postcode/zip code, use the '↑' and '↓' keys to select a character and press 'ENTER'. If the correct character is already displayed, just press 'ENTER'. Use the 'CLEAR' key to correct an entry. Available characters are 0-9, -, SPACE and A-Z.
STEP 71	Saved record 43	The first fusion cycle record is saved.
STEP 72	Saved record 44 To continue-press 1	The second fusion cycle record is saved. If a fault occurs during the first fusion cycle, that fault record only is saved since the second fusion cycle is aborted. Press '1' to return to the main menu.
STEP 73	→Run Fusion Cycle Transfer Records	Use the '↑' and '↓' keys to select and press 'ENTER' to run another fusion cycle or transfer records.

Transfer of Records

- | | | |
|--------|---|--|
| STEP 1 | Run Fusion Cycle
→ Transfer Records | Select using the '↑' or '↓' key and press 'ENTER' to transfer records |
| STEP 2 | Transfer records
Yes/No | Press 'No' to return to the main menu or 'Yes' to continue. |
| STEP 3 | There are 47
stored records | EITHER this |
| | No stored records | OR this will be displayed. If there are no stored records, the main menu will be re-displayed after a short delay. |
| STEP 4 | → All records
Selected records | The transfer options menu is then displayed. Select using the '↑' or '↓' keys and press 'ENTER' to transfer records. |
| | Fault records only
Test records only | |
| STEP 5 | Start at _
Finish at _ | If selected records are to be transferred, this is displayed. Enter the first record no. and press 'ENTER', enter the last record no. and press 'ENTER'. If an incorrect entry is made, press the 'CLEAR' key and re-enter. |
| STEP 6 | → Transfer via modem
Transfer to pc | The transmission options menu is then displayed. Select using the '↑' or '↓' keys. If 'Transfer via modem' is selected, press 'ENTER' and continue. To transfer records to a pc go to the end of this section (page 28) for details. |
| | Modem not fitted | If 'Transfer via modem' is selected and the modem is not fitted, this is displayed. After 2 secs., the main menu is re-displayed. |
| STEP 7 | Initiating record
transfer | |
| STEP 8 | Logging on | |

STEP 9	PPP connected	<p>These messages are advisory only and indicate the progress of the transfer operation. No action is required by the operator.</p>
STEP 10	Opening FTP connection	
STEP 11	FTP connection open	
STEP 12	Initialising record transfer	
STEP 13	Transferring records	
STEP 14	Closing FTP connection	
STEP 15	Closing PPP connection	
STEP 16	Records transferred successfully	
STEP 17	Clear records Yes/No	<p>This is then displayed. Press 'No' to return to the main menu or 'Yes' to continue.</p>
STEP 18	ARE YOU SURE? Yes/No	<p>Press 'Yes' to delete ALL records and return to the main menu. Press 'No' to return to the main menu without deleting the records.</p>

If there is a problem connecting to the network or the server, one of the following messages will be displayed.

STEP 19	Transfer failed Retry 2 in 56 secs	<p>If messages (19) through (21) occur, two further attempts will be made to transfer the records at 90 sec. intervals.</p>
STEP 20	PPP connect failed Retry 2 in 56 secs	
STEP 21	FTP connect failed Retry 2 in 56 secs	

STEP 22	Re-initiating record transfer	At the end of the timeout period this will be displayed. The transfer process will then be repeated from step (7).
STEP 23	PPP connect failed Try again later	After three failed attempts to transfer records, one of the following will be displayed. The main menu will then be displayed after a short delay.
STEP 24	FTP connect failed Try again later	
STEP 25	Transfer failed Try again later	
STEP 26	Modem comms error - resetting modem	If there is an internal problem communicating with the modem, this will be displayed.
STEP 27	Re-initiating record transfer	After the modem has been re-initialised (in less than 10 secs.), this will be displayed and the transfer process will then be repeated from step (7).

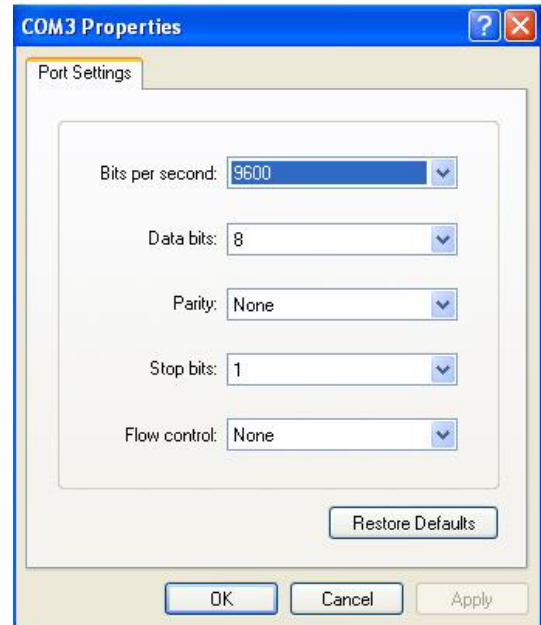
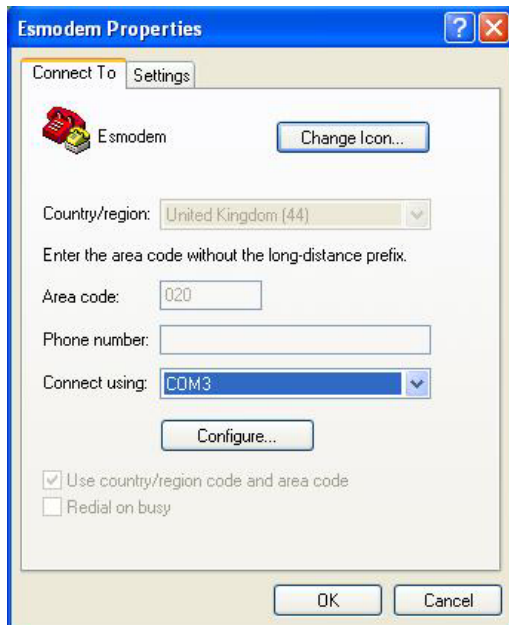
It is possible to initiate a record transfer remotely using a text command (see the section on 'SMS Text Commands' on page 45). This process only occurs if the unit is displaying the main menu, it will not occur while running a fusion cycle. The following will be displayed.

SMS request rcvd to
transfer records

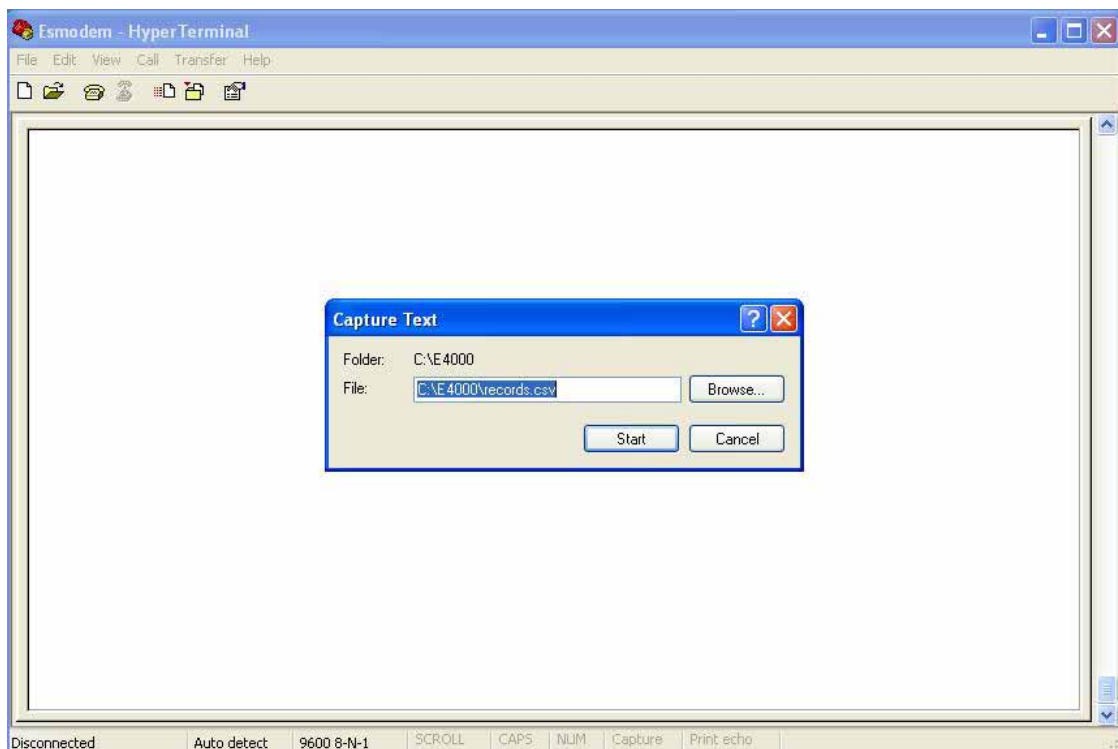
The transfer process will proceed from step (7). No action is required by the operator.

OPERATING INSTRUCTIONS FOR DOWNLOADING RECORDS TO A PC.

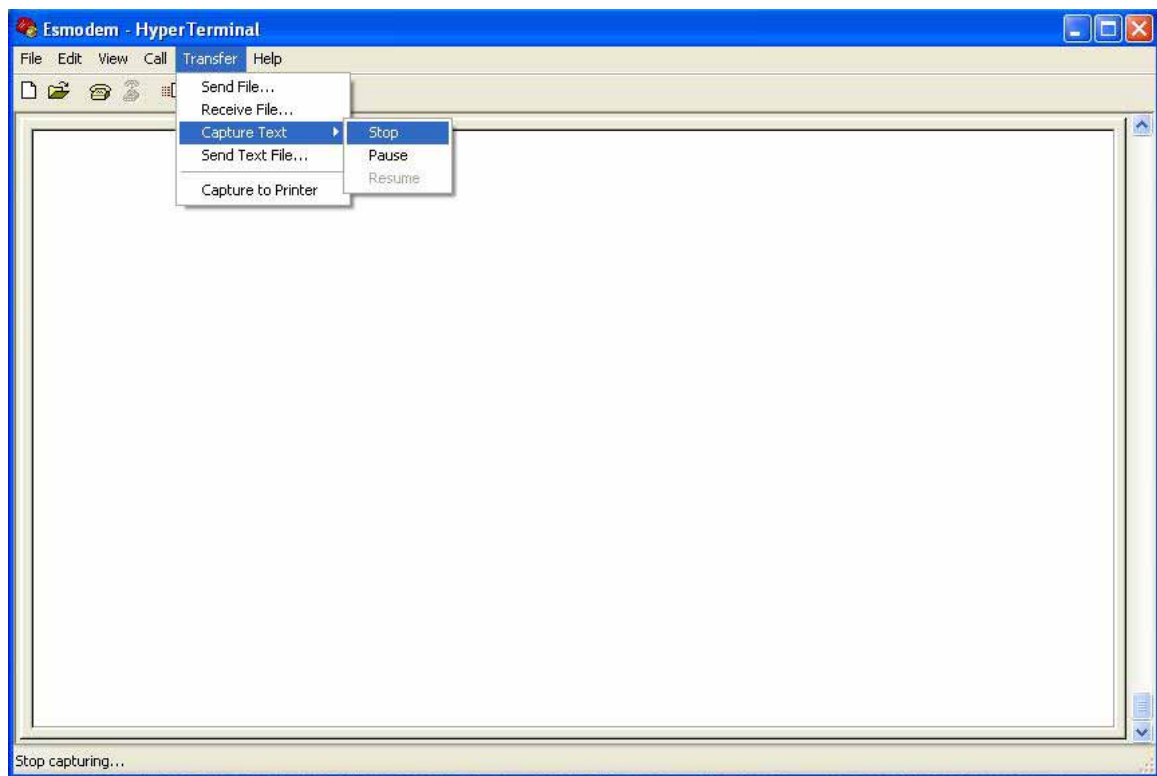
- 1) Connect the unit's scanner port to one of the comm. ports on a pc using the cable supplied by Electro-Services. If the pc is only fitted with USB ports, it will be necessary to obtain an RS232-to-USB converter such as the Sealevel 2105 USB serial adapter and install the software supplied for managing the comm. port.



- 2) Open HyperTerminal on the pc and configure the appropriate comm. port to 9600 baud, 8-bit, no parity, 1 stop bit and no flow control.



- 3) On the HyperTerminal toolbar select 'Transfer' and, in the drop down menu, select 'Capture Text'. In the 'Capture Text' window, enter the path and filename (use the filename extension '.csv', e.g. 'records.csv') where the records are to be stored and click on the 'START' button.



- 4) On the unit, select 'Transfer to pc' using the '↓' key and press 'ENTER'; the record data will then be downloaded to the pc and appear in the HyperTerminal window. Reselect 'Transfer' on the HyperTerminal toolbar, move the mouse cursor to 'Capture Text' and, in the options menu, click on 'Stop'.

Clear records
Yes/No

On completion of the download, this is displayed. Press 'No' to return to the main menu or 'Yes' to continue.

ARE YOU SURE?
Yes/No

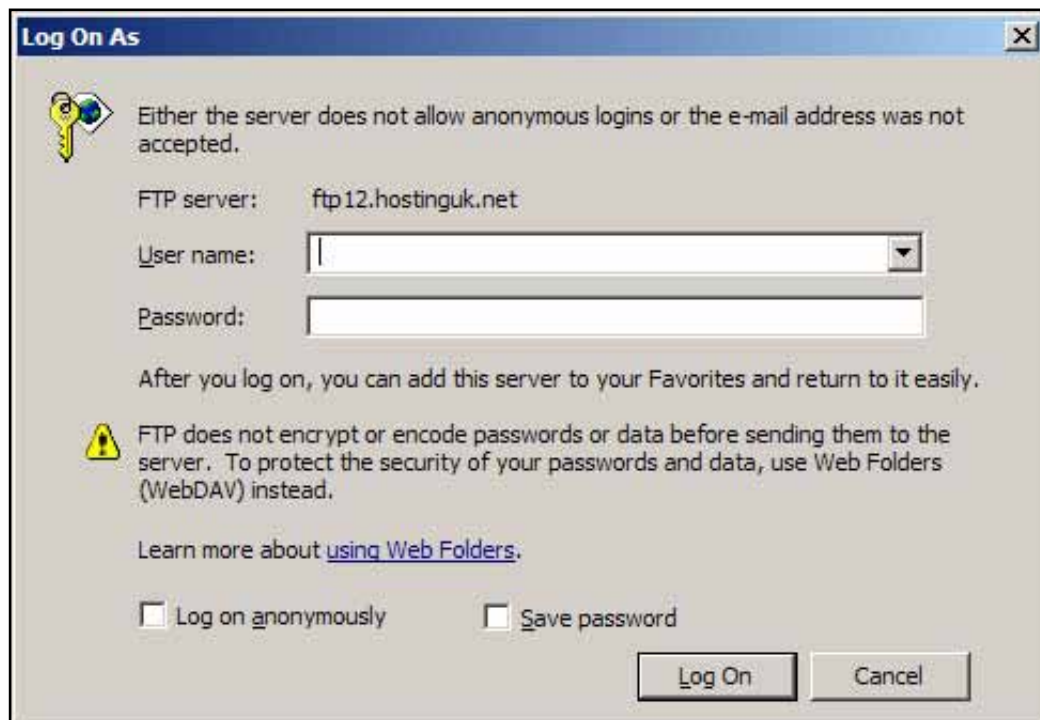
Press 'Yes' to delete ALL records and return to the main menu. Press 'No' to return to the main menu without deleting the records.

Data Retrieval














Data retrieval is via an integral GPRS modem. When records are transferred from the unit, the joint information is stored on a secure FTP site which is managed by Electro Services Ltd. Your unique login details will enable you to view and download the data.

To access this information it is suggested you use an FTP package like GlobalSCAPE CuteFTP or Core FTP. It is possible to access the FTP site using Windows. To do this, open your internet browser and put FTP's site location in the address bar (this will be given to you as part of you unique login details) and press return or click on the "GO" button.

You will be presented with the following logon screen:



Enter your user name and password in the relevant fields. Once completed click on the “Log On” button and you will be logged onto the FTP server. Your internet browser will then display any joint files that have been uploaded to the site. Shown below:

Name ▲	Size	Type	Modified
 E0000007050700092341.csv	753 bytes	Microsoft Office Exc...	05/07/2010 08:25
 E0000007050700092534.csv	753 bytes	Microsoft Office Exc...	05/07/2010 08:26
 E0000007050700093110.csv	742 bytes	Microsoft Office Exc...	05/07/2010 08:34
 E0000007050700093638.csv	710 bytes	Microsoft Office Exc...	05/07/2010 08:37
 E0000007050700093934.csv	750 bytes	Microsoft Office Exc...	05/07/2010 08:40
 E0000007050700094515.csv	0 bytes	Microsoft Office Exc...	05/07/2010 08:46
 E0000007050700094619.csv	733 bytes	Microsoft Office Exc...	05/07/2010 08:47
 E0000007050700094831.csv	733 bytes	Microsoft Office Exc...	05/07/2010 08:49
 E0000007050700095010.csv	751 bytes	Microsoft Office Exc...	05/07/2010 08:51
 E0000007050700095321.csv	748 bytes	Microsoft Office Exc...	05/07/2010 08:54
 E0000007080600131735.csv	377 bytes	Microsoft Office Exc...	08/06/2010 12:19
 E0000007080600131913.csv	356 bytes	Microsoft Office Exc...	08/06/2010 12:20
 E0000007080600132121.csv	517 bytes	Microsoft Office Exc...	08/06/2010 12:22

Each filename is prefixed with the serial number of the MultiFuse+ unit that created the joints. The joint information has also been uploaded to our client portal www.multifuse.co.uk.

To access your information, click **Login** which is located on the left hand side of the screen. You will be presented with the following screen:


[Login](#)

Please enter your username and password in the form below, if you do not have a user and password you can register by clicking [here](#)

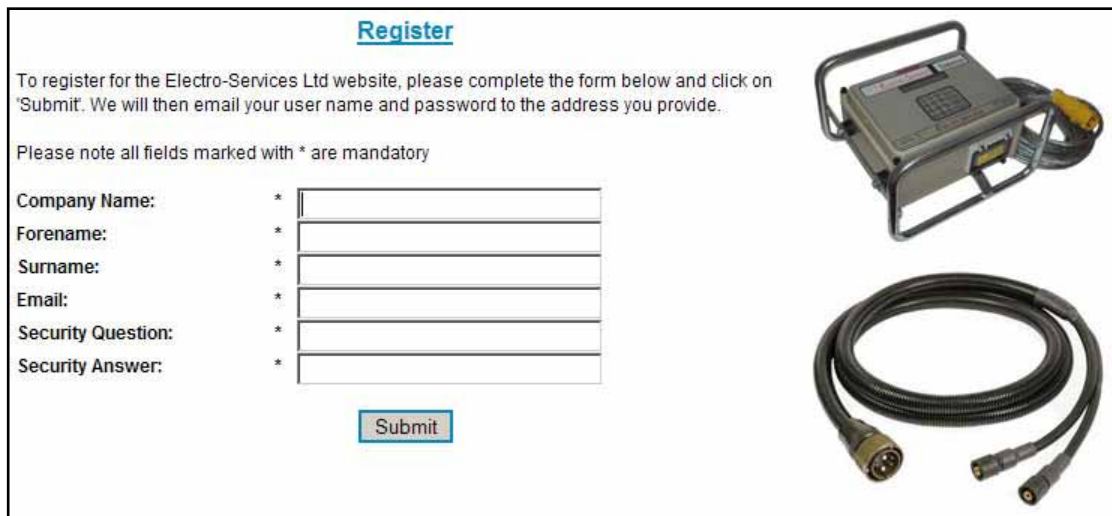
Username:
Forgotten your username? [Click Here](#)

Password:
Forgotten your password? [Click Here](#)

☒ Remember me on this computer.



If you do not have login details for this site, click on the “Register” link. You fill out the following form:



Register

To register for the Electro-Services Ltd website, please complete the form below and click on 'Submit'. We will then email your user name and password to the address you provide.

Please note all fields marked with * are mandatory

Company Name:	*	<input type="text"/>
Forename:	*	<input type="text"/>
Surname:	*	<input type="text"/>
Email:	*	<input type="text"/>
Security Question:	*	<input type="text"/>
Security Answer:	*	<input type="text"/>

Electro Services will process the registration and email you when it has been completed. Once logged into the website you will gain access to three new links:

Register Your Box

Each MultiFuse+ unit you own needs to be registered with the site

View Joints

Facility to view the Joints uploaded to the site

Joint Reports

Facility to search through all the joints uploaded to the site

Register Your Box

Before your MultiFuse+ unit can be used with the site it needs to be registered. To do this select the “Register Your Box” link on the left hand side of the screen. You will be presented with the following screen;

Register Your MultiFuse+

Please enter the serial number of the box you wish to register. Once submitted, there will be a short validation process before your box is made available on your account.


Serial Number: *

Telephone Number: *

Sim Card Number: *

Below is list of the MultiFuse+ box you have already registered on this account:

Serial Number	Telephone Number	Sim Card Number	Status
E0106091	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E0210777	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E1702101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E1803102	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E2401101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E2503101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated



First check whether your unit has already been registered by checking the table at the bottom of the screen. If there are no units or the serial number of your unit is not in the list, you will need to register the unit.


Registering the unit is a simple matter of filling out the form at the top of the form and clicking the “Submit” button. Once submitted you will be presented with the following screen:

Register Your MultiFuse+

The Electro-Fusion Box Serial Number you entered has been registered on the system. Please [click here](#) to register another box.

Below is list of the MultiFuse+ box you have already registered on this account:

Serial Number	Telephone Number	Sim Card Number	Status
E0106091	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E0210777	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E1702101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E1803102	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E2401101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
E2503101	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Validated
EXXXXXXX	XXXXX XXX XXX	XXXX XXXX XXXX XXXX	Awaiting Validation



The unit you registered will appear in the table with a Status of “Awaiting Validation”. Electro Services will then confirm that you own that particular MultiFuse+ unit and change the status to Validated.


View Joints

This screen gives you the ability to view all the joints for a particular MultiFuse+ unit. To access this screen, select the “View Joints” link on the left hand side of the screen. You will be presented with the following screen;

[View Joints](#)

Please select the box you wish to view joints for:

Action	Serial Number	No. of Joints	% Complete	Last Joint Uploaded
View Joints	E0106091	0	N/A	
View Joints	E0210777	38	65.79%	25/05/2010 11:51
View Joints	E1702101	18	100.00%	24/02/2010 16:47
View Joints	E1803102	1	100.00%	18/03/2010 12:49
View Joints	E2401101	2	100.00%	27/01/2010 21:00
View Joints	E2503101	10	100.00%	29/03/2010 13:03



The table will show all of your registered and validated units. Each line details:

- Serial Number of the unit
- The number of uploaded joints
- What percentage of joints were completed
- Date/Time of the last joint uploaded

To view the joints, find the relevant serial number in table and click on the “View Joints” link, this will take you to the following screen;

View Joints for Box Serial Number: E0210777					
Please click here to import new joints or click here to select another box.					
Displaying joint by Date/Time of Joint in ascending order. To change the sort order click the relevant arrow by the column heading  for ascending and  for descending.					
Action	 Joint No. 	 Operator 	 Date/Time 	 Result 	 GPRS Co-Ordinates 
View Joint	009	234671	10/02/2010 21:29:46	Cycle complete	KT3 6JF
View Joint	010	234671	11/02/2010 16:56:09	Cycle complete	KT3 6JF
View Joint	011	234671	11/02/2010 16:57:02	Cycle complete	KT3 6JF
View Joint	012	234671	11/02/2010 17:15:18	Cycle complete	KT3 6JF
View Joint	013	234671	11/02/2010 17:16:24	Cycle complete	KT3 6JF
View Joint	014	234671	11/02/2010 17:17:05	Cycle complete	KT3 6JF
View Joint	015	234671	11/02/2010 17:18:00	Cycle complete	KT3 6JF
View Joint	016	234671	11/02/2010 17:19:11	Cycle complete	KT3 6JF
View Joint	017	234671	11/02/2010 17:20:04	Cycle complete	KT3 6JF
View Joint	018	234671	11/02/2010 17:20:59	Cycle complete	KT3 6JF

This screen gives you ability to view all the joints for a specific MultiFuse+ unit. To import any joints that have been uploaded to the FTP site, use the link at top of the page.

The table shows you all of the joints that have been imported into the system for the selected unit. Each line details;

Joint Number

Operator Code

Date/Time of the Joint

Joint Result

GPRS Co-Ordinates

These joints can be sorted by any of the fields using the arrow icons. To get more information on a particular joint use link in the first column "View Joint". Once selected you will be presented with the joint details screen;

[View Joint for Box Serial Number: E0210777](#)

Please [click here](#) to select another joint or [click here](#) to select another box.

Joint No.: 140
Operator Code: N/A
Location: 5200.0090N00045.9847W
Date/Time of Joint: 11/05/2010 10:49:25
Pipe Scraped/Clamped: Yes
Set Weld Time(s): 111
Actual Weld Time(s): 111
Set Cooling Time(s): 60
Actual Cooling Time(s): 60
Result: Cycle complete

Sample Time	Output Volts (V)	Output Current (A)	Output Energy (kJ)
1.00	38.30	49.80	0.65
11.10	39.50	50.90	20.97
22.20	39.50	51.00	43.24
33.30	39.50	50.90	65.50
44.40	39.40	50.90	87.63
55.50	39.50	50.90	109.77
66.60	39.40	50.90	131.89
77.70	39.50	50.80	153.99
88.80	39.50	50.90	176.10
99.90	39.40	50.40	198.21
111.00	39.50	50.90	220.31



This page shows you the joint details including a breakdown of the joint. The breakdown shows the Output Voltage, Current and Energy over 11 points during the joint.


Joint Reports

From here you can search all the joints that have been uploaded onto the site. You will be presented with the Joint Report search form.

Joint Report

Please enter the search parameters in the text boxes below:

Serial Number:	<input type="text" value="E0"/>	Start of Field ▾
Joint No.:	<input type="text"/>	Any Part of Field ▾
Operator Code:	<input type="text"/>	Any Part of Field ▾
Joint Date:	<input type="text"/>	to <input type="text"/>
Set Weld Time(s):	<input type="text"/>	to <input type="text"/>
Actual Weld Time(s):	<input type="text"/>	to <input type="text"/>
Set Cooling Time(s):	<input type="text"/>	to <input type="text"/>
Actual Cooling Time(s):	<input type="text"/>	to <input type="text"/>
Joint Result:	Not Selected ▾	
Pipe Scraped/Clamped:	<input type="radio"/> Yes <input type="radio"/> No	



As you can see, you have the facility to search by a variety of fields. The first three search parameters have a drop down list, the option for this list is shown below;

Serial Number:	<input type="text"/>	Any Part of Field ▾
Joint No.:	<input type="text"/>	Exact Match
Operator Code:	<input type="text"/>	Start of Field
		End of Field
		Any Part of Field

If for example you were looking for any boxes that have a serial number that starts with **E0** then fill in the search parameters as per the example below;

Serial Number:	<input type="text" value="E0"/>	Start of Field ▾
----------------	---------------------------------	------------------

This will return all the joints for any MultiFuse+ unit with a serial number that starts with **E0**. Once you have entered all of your search criteria, click on the “**Search for Joints**” button at the bottom of the screen.

The next page will show you your search results;

Joint Search Results

Displaying records 1 to 38 of 38 results sorted by in ascending order. To change the sort order click the relevant arrow by the column heading ▲ for ascending and ▼ for descending.

You have filtered your search by: Serial Number starting with E0, to change your search criteria please [Click Here](#).

Action	▲ Serial Num. ▼	▲ Joint Num. ▼	▲ Operator Code ▼	▲ Date/Time of Joint ▼	▲ Joint Result ▼	▲ GPRS Co-ordinates ▼
View	E0210777	009	234671	10/02/10 09:29:46	Cycle complete	KT3 6JF
View	E0210777	010	234671	11/02/10 04:56:09	Cycle complete	KT3 6JF
View	E0210777	011	234671	11/02/10 04:57:02	Cycle complete	KT3 6JF
View	E0210777	012	234671	11/02/10 05:15:18	Cycle complete	KT3 6JF
View	E0210777	013	234671	11/02/10 05:16:24	Cycle complete	KT3 6JF
View	E0210777	014	234671	11/02/10 05:17:05	Cycle complete	KT3 6JF
View	E0210777	015	234671	11/02/10 05:18:00	Cycle complete	KT3 6JF
View	E0210777	016	234671	11/02/10 05:19:11	Cycle complete	KT3 6JF
View	E0210777	017	234671	11/02/10 05:20:04	Cycle complete	KT3 6JF
View	E0210777	018	234671	11/02/10 05:20:59	Cycle complete	KT3 6JF
View	E0210777	019	234671	11/02/10 05:21:49	Cycle complete	KT3 6JF
View	E0210777	020	234671	11/02/10 05:22:56	Cycle complete	KT3 6JF
View	E0210777	021	234671	11/02/10 05:31:21	Cycle complete	KT3 6JF

These joints can be sorted by any of the fields using the arrow icons. To get more information on a particular joint use link in the first column of each link "View Joint".

Fault Finding

The following are displayed if a fault occurs during a fusion cycle.

MESSAGE	POSSIBLE CAUSE	REMEDY
Input Fault 43 secs To continue-press 1	Supply voltage outside acceptable limits. Generator or faulty input lead.	Check generator output and input lead / connector.
Fitting o/c 43 secs To continue-press 1	Faulty output lead or fitting disconnected.	Check output lead / connector, re-connect fitting.
	Faulty fitting.	Replace fitting.
Fitting s/c 43 secs To continue-press 1	Output lead fault.	Check / replace output lead.
	Faulty fitting.	Replace fitting.
High output 43 secs To continue-press 1	High output voltage. Faulty output lead.	Check / replace output lead.
	Internal unit fault or unit out of calibration.	Return to Electro-Services Ltd.
Low output 43 secs To continue-press 1	Low output voltage. Faulty output lead.	Check / replace output lead.
	Internal unit fault or unit out of calibration.	Return to Electro-Services Ltd.
Cycle stopped 43 secs To continue-press 1	'STOP' button pressed during a fusion cycle.	Press '1' to continue operation and save fusion record.
Reset trip 43 secs To continue-press 1	Circuit breaker or RCCB on 80V or MV units) has operated.	Reset the trip/s on the side of the unit. If the problem persists contact Electro-Services Ltd.
Clamp fault 43 secs To continue-press 1	If a clamp is fitted which incorporates detection circuitry, this occurs if the clamp is removed during a fusion cycle.	Check the fitting of the clamp.
	Clamp lead fault.	Check / replace the clamp.

Pressing '1' will cause the following to be displayed;

Saved record 44
To continue-press 1

Press '1' to return to the main menu

If the facility to send fault records has been enabled (see the section on 'SMS Text Commands' on page 45), the following will be displayed;

Transferring fault
record

The transfer process will proceed as in the section 'Transfer of Records', step (7). No action is required by the operator.

Maintenance

Regularly check for obvious defects such as loose or damaged cables and connectors. Look for worn components and broken covers or housings.

There are no user serviceable parts inside the unit. It should be returned to Electro-Services Ltd or an authorised distributor for service, repair and calibration.

It is recommended that the interval between re-calibrations should be no greater than twelve months.

After use, clean the outside of the unit with a soft brush or cloth. Carefully wind up the cables around the frame in the location provided.

Disposal

The equipment and packaging should be sorted for environmentally friendly recycling. **DO NOT DISPOSE THIS EQUIPMENT INTO HOUSEHOLD WASTE!**



According to the European Directive 2002/96/EC Waste Electrical and Electronic Equipment (WEEE), when no longer suitable for use, this equipment must be separately collected and sent for recycling.

Calibration

The MultiFuse+ unit has been manufactured, inspected and tested in accordance with the quality control systems in place at Electro-Services Ltd.

The MultiFuse+ has been calibrated using equipment that is traceable to national and international standards. The MultiFuse+ has a twelve month calibration and warranty period, active from the first use of the unit by the end user customer.

Warranty and Liability

Conditions of Warranty

The warranty covers only those defects to the product which arise from normal use of the product, and will become invalid if any of the following apply;

- Failure to follow the operating instructions
- Improper or inadequate maintenance
- Unauthorised modification
- Misuse or any use not in accordance with the operating manual or good industry practice
- Physical abuse of the product
- Operation outside the products specifications
- Improper site preparation or site maintenance
- Faulty pipe or fitting

Extent of Warranty

Subject to the conditions and limitations of warranty; Electro-Services Ltd warrants that its electrical products will be free from defects in materials and workmanship for a period of twelve months, and its mechanical products for six months, from date of purchase by the end-user customer.

If during this period, notice of a defect which is covered by this warranty is received, then Electro-Services Ltd will either repair or replace the product at its option. Any replacement product will have functionality at least equal to that of the product being replaced and will in our opinion perform consistently with its age and usage.

Unless otherwise agreed, all warranty work will be carried out by Electro-Services Ltd.

Customers will prepay all shipping charges for products returned under warranty and Electro-Services Ltd will charge for return of the products back to the customer.

Limitations of Warranty

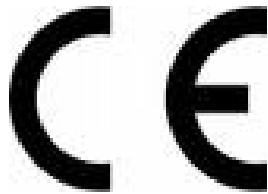
Liability will not be accepted in the following cases;

- The MultiFuse+ is used outside the indicated application area
- The operator has not been trained to use the MultiFuse+
- Operating instructions have not been observed
- Safety instructions have not been observed
- Unauthorised repairs, maintenance or modifications have been carried out
- The MultiFuse+ has been used outside of its technical specification
- Improper or inadequate maintenance
- Misuse or any use not in accordance with the operating manual or good industry practice
- Physical abuse of the product
- Improper site preparation or site maintenance

Product Specification

Operating Type:	Controlled voltage
Operating Modes:	Manual, Bar Code
Operating Languages:	English
Operating Temperature:	-10°C to +45°C
Welding Voltage:	18V - 80V
Welding Current:	85 Amps (maximum)
Welding Time:	Up to 9999 seconds
Cooling Time:	Up to 166 minutes
Apparent Power Factor:	1
Input Voltage:	85v - 160v
Supply Protection:	Class 1 earthed
Record Data Memory:	2000 welds (maximum)
Data download/upload:	Optional
Weight:	11.5kg - 25kg
Size:	Length 17", Width 15" and Height 17"
Protection Level:	IP67

Declaration & Conformity



This welding unit has been designed to comply with the harmonised standards under the “New Approach” directives, and has been CE marked accordingly.

The applicable standards are:

89/336/EEC	Electromagnetic compatibility
73/23 EEC	Low voltage equipment
98/37/EC	Machinery safety
IEC 60529	Protection Rating

On behalf of Electro-Services Ltd

Nigel James
CEO

Glossary - SMS Text Commands

1) Send Selected Records

CMD=2,x,y where x = start record no., y = finish record no.

Response is :-

ACK=2,Sending records OR ACK=2,No records OR
ACK=2,Record nos. out of range

2) Send All Records

CMD=3

Response is :-

ACK=3,Sending records OR ACK=3,No records

3) Send Fault Records Only

CMD=4

Response is :-

ACK=4,Sending records OR ACK=4,No records

4) Send Test Records Only

CMD=5

Response is :-

ACK=5,Sending records OR ACK=5,No records

5) Get No. of Records

CMD=6

Response is :-

ACK=6,There are x records where x is the total no. of stored records

6) Request GPS location

CMD=7

Response is:-

ACK=7,xxxxx.xxxxAyyyyy.yyyyB,hh:mm:ss,dd/mm/yy

where xxxxx.xxxx is latitude, A is N/S indicator, yyyyy.yyyy is longitude, B is E/W indicator followed by the time and date in standard format.

7) Clamp detection enable/disable

CMD=8,x where x = 1 to disable clamp detection OR x = 0 to disable the function

Response is:-

ACK=8,Clamp disabled OR ACK=8,Clamp enabled

8) Fault record transfer text notification

CMD=9,x where x = 1 to enable the sending of fault records OR x = 0 to disable the function

The number of the mobile phone from which this command is sent is stored in non-volatile memory. The numbers of up to three recipients can be stored. The responses are as follows:-

ACK=13,Fault record notification request accepted	New recipient accepted.
ACK=15,Fault record notification request confirmed	Existing recipient verified.
ACK=16,Fault record notification directory full	No new recipient can be accepted.

An existing recipient can delete their directory entry by sending 'CMD=9,0', the response is

ACK=14,Fault record notification request cancelled	Recipient's entry is deleted.
OR	
ACK=17,Fault record notification request doesn't exist	Recipient's entry doesn't exist.

If a fault record is transferred, the following message is sent to the phones of all recipients.

CMD=9,Sending fault record

9) Delete All Records

CMD=10

Response is:-

ACK=10, Confirm deletion

SEND ACK=11,1 to confirm record deletion
OR ACK=11,0 to abort deletion

Response to this is:-

ACK=11,Records deleted OR ACK=12, Deletion aborted

If the above sequence isn't followed the response is ACK=13, Invalid command

10) Invalid Commands

If an invalid command is sent (e.g. CMD=22), response is ACK=13, Invalid command

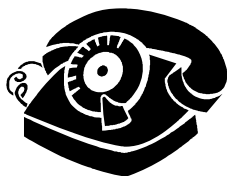
Global



Electro-Services Ltd specialises in the design, development and manufacture of Electro Fusion. Our aim is to be the preferred supplier of choice of high performance and quality equipment whilst encompassing advanced product technologies.

The **MultiFuse+** is a universal product which can be used anywhere in the world due to the voltage range. Data download can be done anywhere, making the **MultiFuse+** a truly global product.

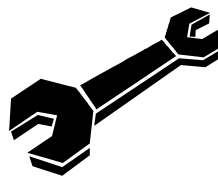
Technical Support



MultiFuse+ equipment users have easy access to technical support.

A call to our technical department at our Head Office, will put you in immediate contact with our dedicated in-house engineers who will be able to assist you with your query.

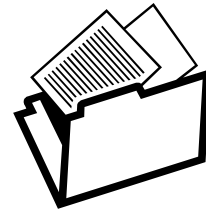
Servicing and Repair



Electro-Services Ltd has an in-house team of technicians and dedicated service facilities.

Electro-Services Ltd can offer a complete support service along with the annual re-calibration service for the **MultiFuse+** in-house.

Training



Product training for your operators and personnel is available from our Head Office, or this can be arranged to be delivered on site.

Training will be with qualified instructors and each trainee will receive a certificate to confirm they have received training on the **MultiFuse+**.

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